

## **II. REMARKS**

The Examiner has withdrawn, in part, the restriction/election requirement under 35 U.S.C. §§ 121 and 372 so that claims 14-22 pertaining to the elected invention have been examined, and claims 23-33 have been withdrawn because they pertain to non-elected invention (Office Action, dated January 7, 2009, at 2, lines 3-7).

With the present amendment above, claims 14 and 19 have been amended, and claims 15, 16 and 20 have been cancelled without prejudice. In addition, claims 34 and 25 are newly added.

Specifically, independent claims 14 and 19 have been amended to incorporate the subject matter from dependent claims 16 and 20, respectively. The preamble of claims 14 and 19 has been amended to recite “consisting of” as supported in paragraphs [0017], [0024], and Tables 1 and 2 of Applicant’s specification as originally filed.

New claims 34 and 35, depending on independent claims 14 and 19, respectively, have been added to include the limitation, “the master alloy has a grain size of 50 $\mu$ m or less, after casting,” as supported in Tables 1 and 2 of Applicant’s specification as originally filed.

The present amendment adds no new matter to the above-captioned application.

### **A. The Invention**

The present invention relates to a master alloy used for casting a modified copper alloy having refined grains. Such alloy may be used, for example, in a casting method such as continuous casting, semi-solid metal casting, sand casting, permanent mold casting, low pressure die casting, die casting, lost wax casting, up casting, squeeze, centrifugal casting or the like.

In accordance with an embodiment of the present invention, a master alloy for casting a copper alloy is provided that includes elements recited in independent claim 14.

In accordance with another embodiment of the present invention, a master alloy for casting a copper alloy is provided that includes elements recited in independent claim 19.

Various other embodiments, in accordance with the present invention, are recited in dependent claims 17-18 and 21-22.

An advantage provided by various embodiments of the present invention is that a master copper alloy can provide a method of casting a modified copper alloy capable of refining grains during the melt-solidification of the copper alloy without the problems, for example, that a machine is required for providing refining process of melt-solidification with energy.

**B. The Rejections**

Claim 14, 16 and 18 stand rejected under 35 U.S.C. § 102(b) as allegedly anticipated over Akutsu (U.S. Patent No. 4,874,439, hereafter “Akutsu’439”).

Claims 15, 17 and 19-22 stand rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over Akutsu’439

Claims 14 stands rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over JP 56-090944.

Applicant respectfully traverses the Examiner’s rejections and request reconsideration of the above-captioned application for the following reasons.

**C. Applicant’s Arguments**

**a. The Section 102 Rejection**

Anticipation under 35 U.S.C. § 102 requires showing the presence in a single prior art reference disclosure of each and every element of the claimed invention, arranged as in the

claim. Lindemann Maschinenfabrik GMBH v. American Hoist & Derrick, 221 U.S.P.Q. 481, 485 (Fed. Cir. 1984).

In this case, the Examiner has failed to establish a prima facie case of anticipation against claims 14, 18, and new claims 34 and 36 because Akutsu'439 does not teach, or suggest, each and every limitation recited by these claims.

**i. Akutsu'439**

Akutsu'439 relates to synchronizer ring for use in automotive speed, which made of a Cu alloy having high strength, high toughness and high wear resistance (Akutsu'439, column 1, lines 5-6). This Cu alloy has either; (1) 17-40% Zn (all percents being on a weight basis), 2-11% Al and 50-3,000 ppm of oxygen, as well as 0.1-3.5% of at least one of Ti, Zr and V and an optional element selected from among 0-3% of at least one of Fe, Ni and Co, 0-0.3% of at least one of P, Mg and Ca, 0-2.5% Sn, 0-0.5% Si, 0-4% Mn and 0-1.5% Pb, and with the balance being Cu and incidental impurities; or (2) 17-40% Zn, 2-11% Al, 0.5-6% Mn, 0.1-2% Si, 0.1-3% of at least one of Fe, Ni and Co, 0.003-0.3% of at least one of P, Mg and Ca, 30-1,000 ppm of oxygen, and an optional element selected from among 0-1% Cr and 0-2% of at least one of Pb and Sn, and the balance being Cu and incidental impurities (Akutsu'439, column 2, lines 13-30).

Akutsu'439 does not teach, or suggest, (i) “a master alloy for casting a copper alloy, consisting of: Cu: 40 to 80 wt.%; Zr: 0.5 to 35 wt.%; at least one element selected from the group consisting of Mg: 0.01 to 1 wt.%, Sn: 0.1 to 5 wt.%, B: 0.01 to 0.5 wt.%, Mn: 0.01 to 5 wt.% and Si: 0.01 to 1 wt.%; and the balance of Zn” as recited in independent claim 14 as amended, (ii) “said master alloy is an ingot formed in a shape of a boat, continuous casting material formed in a shape of a rod or wire, or hot extrusion material formed in a shape of a rod or wire” as recited in claim 18, and (iii) “wherein the master alloy has a grain size of

50μm or less, after casting” a recited in new dependent claims 34 and 35.

In Akutsu’439, Al is an essential element for a Cu alloy. For example, in order to prepare a Cu alloy having high strength, high toughness and high wear resistance, the content of Al is limited to be within the ranges of 2-11% (Akutsu’439, column 2, lines 40-56). However, Applicant’s claimed invention excludes alloys containing aluminum. Because all alloys disclosed by Akutsu’439 contain aluminum and oxygen, Akutsu’439 cannot anticipate the subject matter of claim 14 as amended.

With respect to claim 18, the Examiner contends that the cast boat shape is no more than the shape of ingot mold (See Office Action, dated January 7, 2009, at p. 2, lines 13-14). Applicant objects to the to the Examiner’s implied inherency argument. Inherency must be based on an otherwise sufficient disclosure such that the implied subject matter is the natural result flowing from the otherwise sufficient disclosure, and it cannot be based on mere probabilities or possibilities. Continental Can Co. USA v. Monsanto Co., 20 U.S.P.Q.2d 1746, 1749 (Fed. Cir. 1991). The Examiner’s naked speculation falls far short of establishing that all ingots must be boat shapes.

For example, an ingot may have various other non-boat shapes including a waffle cone shape, a rod shape and the like as illustrated in [http://www.nikkin-flux.co.jp/2006/09/post\\_15.html](http://www.nikkin-flux.co.jp/2006/09/post_15.html) instead of a boat shape. Applicant respectfully files herewith as the evidence that ingot may have other shapes besides a boat shape, copies of the web page above in Japanese and a machine-translated English version thereof (See Exhibit 1).

For all of the above reasons, Akutsu’439 does not anticipate the subject matter of claims 14, 18, 34 and 35.

**b. The Section 103 Rejection**

A prima facie case of obviousness requires a showing that the scope and content of the prior art teaches each and every element of the claimed invention, and that the prior art provides some teaching, suggestion or motivation, or other legitimate reason, for combining the references in the manner claimed. KSR International Co. v. Teleflex Inc., 127 S.Ct. 1727, 11739-41 (2007); In re Oetiker, 24 U.S. P.G.2d 1443 (Fed. Cir. 1992).

In this case, the Examiner has failed to establish a prima facie case of obviousness against claims 17, 19, 21, 22, 34 and 35 because Akutsu'439 fails to teach all of the limitations of the claims. In addition, the Examiner has failed to establish a prima facie case of obviousness against claims 14, 34 and 35 because JP 56-090944 fails to teach all of the limitations of the claim.

Furthermore, (1) the Examiner has failed to establish a legitimate reason to modify each of JP 56-090944 and Akutsu'439 to arrive Applicant's claimed invention and (2) the Examiner has failed to demonstrate that a person of ordinary skill in the art would have had a reasonable expectation of success of arriving at the claimed invention even if the modification was made. Thus, the rejections under §103 should be reconsidered and withdrawn.

**i. Akutsu'439**

Akutsu'439 is discussed above.

Akutsu'439 does not teach, or suggest, (i) "wherein said Cu occupies 50 to 65 wt.%, and said Zr occupies 1 to 10 wt.%" as recited in claims 17 and 21, (ii) "a master alloy for casting a copper alloy, consisting of: Cu: 40 to 80 wt.%; Zr: 0.5 to 35 wt.%; P: 0.01 to 3 wt.%; at least one element selected from the group consisting of Mg: 0.01 to 1 wt.%, Sn: 0.1 to 5 wt.%, B: 0.01 to 0.5 wt.%, Mn: 0.01 to 5 wt.% and Si: 0.01 to 1 wt.%; and the balance of Zn" as recited in independent claim 19 as amended, (iii) "said master alloy is an ingot formed

in a shape of a boat, continuous casting material formed in a shape of a rod or wire, or hot extrusion material formed in a shape of a rod or wire” as recited in claim 22, and (iv) “wherein the master alloy has a grain size of 50 $\mu$ m or less, after casting” as recited in new dependent claims 34 and 35.

As detailed in the argument against the Section 102 Rejection over Akutsu’439, Al is an essential element for a Cu alloy in Akutsu’439. For example, in order to prepare a Cu alloy having high strength, high toughness and high wear resistance, the content of Al must be within the ranges of 2-11% (Akutsu’439, column 2, lines 40-56). However, Applicant’s claimed invention does not include, and even excludes, aluminum as an element of the Cu alloy.

Furthermore, a person of ordinary skill in the art would have no legitimate reason to modify Akutsu’439’s alloy to remove Al and oxygen because these are essential components of Akutsu’439’s alloy. It is a well-established proposition that obviousness cannot be predicated on a modification of prior art that obliterates an essential feature of the prior art. McGinley v. Franklin Sports Inc., 60 USPQ2d 1001, 1010-11 (Fed. Cir. 2001). One cannot modify prior art in a manner that renders it inoperable. In re Gordon, 221 USPQ 1125 ((Fed. Cir. 1984).

In this case, Al and oxygen are essential elements of Akutsu’439’s alloy, and to remove them would obliterate an essential feature of Akutsu’439’s alloy. The Examiner cannot modify Akutsu’439’s alloy in this manner to obtain the present claimed alloy as a matter of law.

For all of the above reasons, the Examiner has failed to establish a prima facie case of obviousness against claims 17, 19, 21, 22, 34 and 35 of the above-captioned application over Akutsu’439.

**ii. JP 56-090944**

JP 56-090944 relates to an alloy with superior drawability, electrospark characteristics and less consumption made of Zn, Zr and a balance Cu. Such alloy may be used, for example, in a wire cut electrospark machining electrodes (See an English language abstract of JP 56-090944, provided by Patent Abstracts of Japan).

JP 56-090944 does not teach, or suggest, (i) “a master alloy for casting a copper alloy, consisting of: Cu: 40 to 80 wt.%; Zr: 0.5 to 35 wt.%; at least one element selected from the group consisting of Mg: 0.01 to 1 wt.%, Sn: 0.1 to 5 wt.%, B: 0.01 to 0.5 wt.%, Mn: 0.01 to 5 wt.% and Si: 0.01 to 1 wt.%; and the balance of Zn” as recited in independent claim 14 as amended, and (ii) “wherein the master alloy has a grain size of 50 $\mu$ m or less, after casting” as recited in new dependent claims 34 and 35.

JP 56-090944 discloses only Cu-Zr-Zn alloys. No additional element to the Cu-Zr-Zn alloy is disclosed or suggested in JP 56-090944 (See an English language abstract of JP 56-090944, provided by Patent Abstracts of Japan). In contrast, a Cu alloy as claimed in claim 14 includes at least one element selected from the group consisting of Mg: 0.01 to 1 wt.%, Sn: 0.1 to 5 wt.%, B: 0.01 to 0.5 wt.%, Mn: 0.01 to 5 wt.% and Si: 0.01 to 1 wt.%, except basic elements of Cu, Zr and Zn.

For all of the above reasons, the Examiner has failed to establish a prima facie case of obviousness against claims 14, 34 and 35 of the above-captioned application over JP 56-090944.

**iii. No Reasonable Expectation of Success of Achieving Applicant's Claimed Invention Even if the modification of Akutsu'439 and JP 56-090944 Was Made**

New dependent claims 34 and 35 includes “a master alloy of which the grain size is 50 $\mu$ m or less, after casting,” as supported in Tables 1 and 2 of Applicant's specification as

originally filed, respectively. Refining grains of a copper alloy, for example, making grains of a copper alloy having a size of 50 $\mu$ m or less, is strongly desirable because it is very effective in improving 0.2% proof strength (a strength when permanent distortion reaches 0.2%) of a master alloy (paragraph [0002], and Tables 1 and 2 of Applicant's specification as originally filed). Therefore, claims 34 and 35 are patentable independent of the claims on which they depend.

A proper rejection under Section 103 requires showing (1) that a person of ordinary skill in the art would have had a legitimate reason to attempt to make the composition or device, or to carry out the claimed process, and (2) that the person of ordinary skill in the art would have had a reasonable expectation of success in doing so. PharmaStem Therapeutics, Inc. v. ViaCell, Inc., 491 F.3d 1342, 1360 (Fed. Cir. 2007). In this case, the Examiner has failed to demonstrate that a person of ordinary skill in the art would have had a legitimate reason to modify each of Akutsu'439 and JP 56-090944, and a reasonable expectation of success of arriving at Applicant's claimed invention even if the modification was made.

An object of the present invention is to obtain a master copper alloy, which provides a method of casting a modified copper alloy capable of refining grains during the melt-solidification of the copper alloy without the problems, for example, that a machine is required for providing refining process of melt-solidification with energy (paragraphs [0008] and [0009] of Applicant's specification as originally filed).

However, neither Akutsu'439 nor JP 56-090944, either alone or in combination, discloses a modified copper alloy capable of refining grains during the melt-solidification of the copper alloy of which the grain size is 50 $\mu$ m or less, after casting, as recited in claims 34 and 35.

Therefore, a person of ordinary skill in the art would have no reason to modify each of the references to arrive the Applicant's claimed invention. Even if the modification was made,

a person of ordinary skill in the art would not have had a reasonable expectation of success of arriving at the Applicant's claimed invention, because, for example, there is no teaching, suggestion or other reason cited by the Examiner for a modified copper alloy having the compositions as claimed in claims 14 and 19 and capable of refining grains during the melt-solidification of the copper alloy, thereby making the grains having a size of 50 $\mu$ m or less, as recited in claims 34 and 35.

For all of the above reasons, the Examiner has failed to establish a prima facie case of obviousness against claims 14, 17, 19, 21, 22, 34 and 35 of the Applicant's claimed invention.

### III. CONCLUSION

The Examiner has failed to establish a prima facie case of anticipation under 35 U.S.C. § 102(b) based on Akutsu'439, or of obviousness under 35 U.S.C. § 103(a) based on each of Akutsu'439 and JP 56-090944 because:

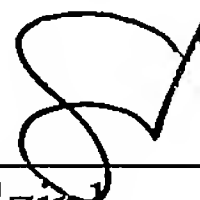
- (i) Akutsu'439 fails to teach each and every limitation of claims 14, 18, 34 and 35;
- (ii) Neither Akutsu'439 nor JP 56-090944, either alone or in combination, teach all the limitations of claims 14, 17, 19, 21, 22, 34 and 35;
- (iii) The Examiner has failed to establish a legitimate reason to make the modification of Akutsu'439 and JP 56-090944; and
- (iv) The Examiner has failed to demonstrate that a person of ordinary skill in the art would have had a reasonable expectation of success in arriving at Applicant's claimed invention even if the improper modification was made.

For all of the above reasons, claims 14, 17-19, 21-22 and 34-35 are in condition for allowance, and a prompt notice of allowance is earnestly solicited.

The below-signed attorney for Applicant welcomes any questions.

Respectfully submitted,

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